# ENVIRONMENTAL PRODUCT DECLARATION

***In accordance with EN 15804:2012+A2:2019 and ISO 14025***

## Gypfine Almomtaz 120

**Date of issue: 2022-10-28**
**Validity: 5 years**
**Valid until: 2027-10-28**
**Version: 1**
**Scope of the EPD®: Egypt Lybia**

The environmental impacts of this product have been assessed over its whole life cycle. Its Environmental Product Declaration has been verified by an independent third party.

**Registration number**
**The International EPD® System:**
**S-P-05703**

**Manufacturers address:**
Building #12b04 , Cairo Festival City , Second Floor

# General information

## Company information

**Manufacturer:** Saint-Gobain Gyproc Egypt
**Programme used:** International EPD System **http://www.environdec.com/**
**EPD registration number/declaration number: S-P-05703**
**PCR identification:** EN 15804:2012+A2:2019 Sustainability of construction works – Environmental product declaration - core rules for the product category of construction product and The International EPD® System PCR 2012:01 version 2.34 for Construction products and Construction services.
**Site of manufacture:** Amreya plant – Gharbanyat – Borg Al Arab Alexandria • Egypt
**Owner of the declaration:** Saint-Gobain Gyproc Egypt
**Product / product family name and manufacturer represented:** Gypfine Almomtaz 120 – Smoothing Compound
**UN CPC code:** 37530 Articles of plaster or of composition based on plaster

**Declaration issued:** 2022-10-28 **Valid until:** 2027-10-28
**Demonstration of verification:** an independent verification of the declaration was made, according to ISO 14025:2010. This verification was external and conducted by the following third party based on the PCR mentioned above.
**UN CPC code:** 37530 Articles of plaster or of composition based on plaster
**EPD Prepared by**: LCA Central Team, Saint-Gobain.
**Contact:** Maged,Helmy (Maged.Helmy@saint-gobain.com), Yves, Coquelet (Yves.Coquelet@saint-gobain.com)

**The declared unit is**: 1 kg of installed Gypfine Almomtaz 120 – Smoothing Compound with a service life of 50 years
*Installed in interior dry wall systems, suspended ceiling, partition wall and curtain wall applications

**Declaration of Hazardous substances: (Candidate list of Substances of Very High Concern):** none
**Geographical scope of the EPD®:** Egypt Lybia

The intended use of this EPD is for B2B communication.

| | |
|---|---|
| **Programme** | The international EPD© System |
| **Adress:** | EPD© International AB Box 210 60 SE-100 31 Stockholm Sweden |
| **Website:** | www.environdec.com |
| **E-mail:** | info@environdec.com |

| |
|---|
| CEN standard UNE-EN 15804 serves as the Core Product Category Rules (PCR) |
| Product category rules (PCR): PCR 2019:14 Construction Products, version 1.1 |
| PCR review was conducted by: El Comité Técnico del Sistema Internacional EPD©<br>President: Claudia A. Peña. Contact via info@environdec.com |
| Independent third-party verification of the declaration and data, according to ISO 14025:2006:<br>☐ EPD process certification ☒ EPD verification |
| Third party verifier: Dr Andrew NORTON<br>In case of recognized individual verifiers: Approved by: The International EPD© System |
| Procedure for follow-up of data during EPD validity involves third part verifier:<br>☒ Yes ☐ No |

# Product description

**Product description and use:**
This Environmental Product Declaration (EPD®) describes the environmental impacts of 1 kg of installed Gypfine Almomtaz 120 – Smoothing Compound and an expected average service life of 50 years.

"Almomtaz 120", is ready-mixed Powder for manual application in the form of a whitish powder, mixed mechanically and packed automatically, with constant tested ratios. It is composed of primary raw materials and additives enhancing the product performance. It has the ability to smooth wall and ceiling plastered surfaces, preparing the surface for the painting phase

**Technical data/physical characteristics:**

| | |
|---|---|
| **Mix density** | 1550 – 1600 kg/m³ |
| **Average coverage rate** | 3.2 – 4 m²/kg per coat (according to surface condition and thickness requirement) |
| **Water requirement** | Approximately 60 ml per 100 g |

**Description of the main product components and/or materials:**
All raw materials contributing more than 5% to any environmental impact are listed in the following table.

| Product components | Weight (%) |
|---|---|
| **Standard product** | **100%** |
| Gypsum (Natural) | 70% |
| Calcium Carbonate | 30% |
| Retarder | 0% – 0.1% |
| HRA (Heat Resistant Accelerator → Gypsum + additives) | 0% – 0.1% |
| Pigment blue | ≤ 0.1% |
| Cellulose | 0% – 0,5% |
| Starch | ≤ 0.1% |
| **Product** | **Weight (kg)** |
| **Total product weight** | **1** |
| **Packaging materials** | **Weight (kg)** |
| Composed bag (three layers: paper LDPE paper) | 0,00664 |
| Wooden pallet | 0,0120 |

During the life cycle of the product any hazardous substance listed in the "Candidate List of Substances of Very High Concern (SVHC) for authorization" has not been used in a percentage higher than 0.1% of the weight of the product. The verifier and the program operator do not make any claim nor have any responsibility of the legality of the product.

# LCA calculation information

| | |
|---|---|
| **EPD TYPE DECLARED** | Cradle to grave and module D<br>Product-specific (one product, one manufacturing site) |
| **DECLARED UNIT** | 1 kg of installed Gypfine Almomtaz 120 – Smoothing Compound |
| **SYSTEM BOUNDARIES** | Cradle to grave + Module D = (A + B + C) +D |
| **REFERENCE SERVICE LIFE (RSL)** | The Reference Service Life (RSL) of the Gypsum product is considered to be 50 years. This 50-year value is the amount of time that we recommend our products last for without refurbishment, and corresponds to standard building design life. |
| **CUT-OFF RULES** | In the case that there is not enough information, the process energy and materials representing less than 1% of the whole energy and mass used can be excluded (if they do not cause significant impacts). The addition of all the inputs and outputs excluded cannot be bigger than the 5% of the whole mass and energy used, as well of the emissions to environment occurred.<br>Flows related to human activities such as employee transport are excluded.<br>The construction of plants, production of machines and transportation systems are excluded since the related flows are supposed to be negligible compared to the production of the building product when compared at these systems lifetime level. |
| **ALLOCATIONS** | Allocation has been avoided when possible. For the energy, the auxiliaries used and wastes generated during manufacturing a physical allocation based on mass was applied.<br><br>Allocation criteria are based on mass. The polluter pays as well the modularity principles have been followed. |
| **GEOGRAPHICAL COVERAGE AND TIME PERIOD** | Scope includes: Egypt Libya<br>Data is collected from one production site in Amreya plant – Gharbanyat – Borg Al Arab Alexandria, Saint-Gobain Gyproc Egypt<br>Data collected for the year 2021.<br>Cradle to grave study.<br>Background data: Ecoinvent 3.6 and GaBi ts 9.2 |
| **PRODUCT UN CPC CODE** | 37530 Articles of plaster or of composition based on plaster |

According to EN 15804:2012+A2:2019, EPDs of construction products may not be comparable if they do not comply with this standard. According to ISO 21930, EPDs might not be comparable if they are from different programmes.

# Life cycle stages

*Flow diagram of the Life Cycle*

## Product stage, A1-A3

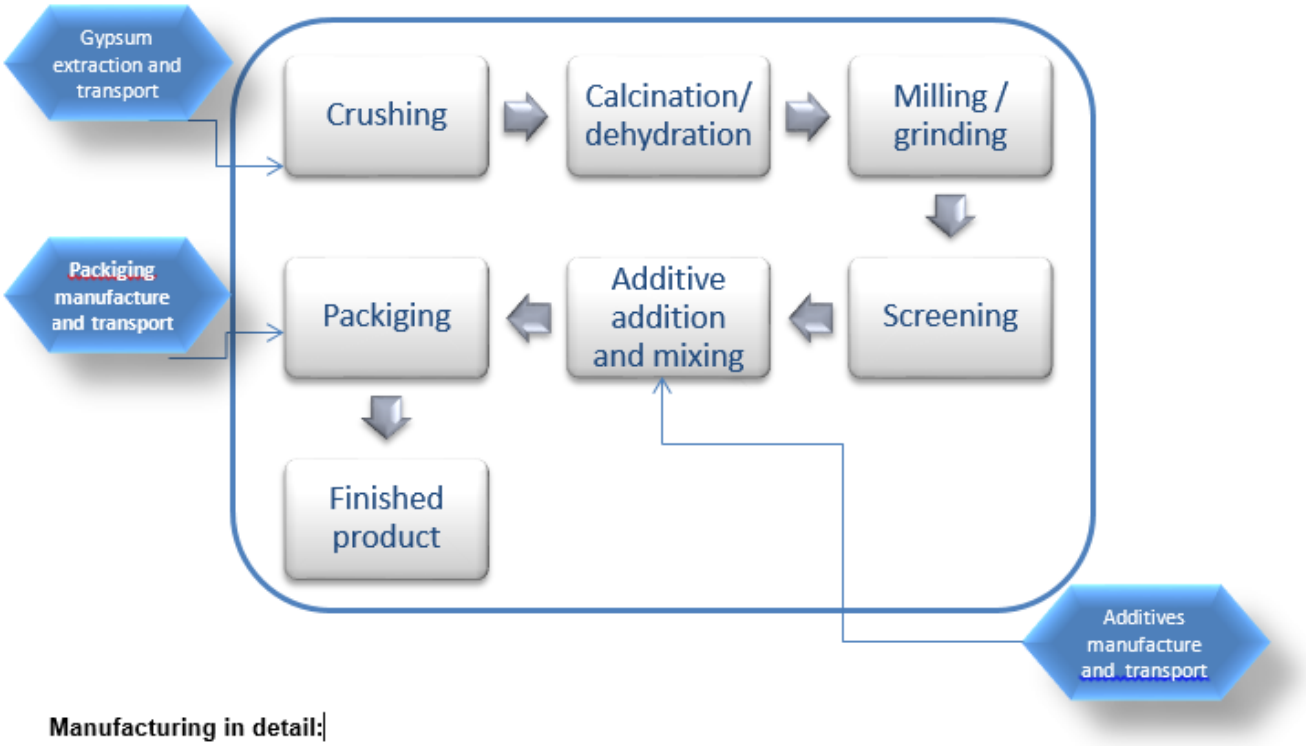
Description of the stage: the product stage of plaster products is subdivided into 3 modules A1, A2 and A3 respectively “Raw material supply”, “transport to manufacturer” and “manufacturing”.

**A1, raw material supply.**
This includes the extraction and processing of all raw materials and energy which occur upstream from the manufacturing process.

**A2, transport to the manufacturer.**
The raw materials are transported to the manufacturing site. The modelling includes road, boat and/or train transportations of each raw material.

**A3, manufacturing.**
This module includes the manufacture of products and the manufacture of packaging. The production of packaging material is taken into account at this stage. The processing of any waste arising from this stage is also included.

### Manufacturing process flow diagram




**Manufacturing in detail:**

Gypsum rock is open pit quarried by drilling and blasting, then transported to a crushing plant where it is crushed, screened and stockpiled according to its quality. The stockpiled ore transported by trucks to manufacturing factory is first crushed to reduce rocks size and further dehydrated in calcining kilns to produce hemihydrate (stucco). Stucco is further ground to obtain a specific surface area and then screened to remove any particles that are too large. In the manufacture of plasters, stucco is batch mixed with additives and aggregates to produce finished product. The thoroughly mixed plaster is fed to a bagging operation.
Gypsum waste is reintegrated back into the manufacturing process wherever possible.

## Construction process stage, A4-A5

Description of the stage: the construction process is divided into 2 modules: A4, transport to the building site and A5, installation in the building

**A4, transport to the building site.**
This module includes transport from the production gate to the building site. Transport is calculated on the basis of a scenario with the parameters described in the following table.

| PARAMETER | VALUE (expressed per functional unit) |
|---|---|
| **Fuel type and consumption of vehicle or vehicle type used for transport e.g. long distance truck, boat, etc.** | Long distance truck, maximum load weight of 24 t and consumption of 0.38 liters per km |
| **Distance** | 319.5 km |
| **Capacity utilisation (including empty returns)** | 68 % (30% empty returns) |
| **Bulk density of transported products** | 848 kg/$m^3$ |
| **Volume capacity utilisation factor** | 100 % |

**A5, installation into the building.**
The accompanying table quantifies the parameters for installing the product at the building site. All installation materials and their waste processing are included.

| PARAMETER | VALUE (expressed per functional unit) |
|---|---|
| **Ancillary materials for installation (specified by materials)** | None |
| **Water use** | 0.6 liters/kg |
| **Other resource use** | None |
| **Quantitative description of energy type (regional mix) and consumption during the installation process** | 0,024 MJ / kg (mixing energy) |
| **Wastage of materials on the building site before waste processing, generated by the product's installation (specified by type)** | Plaster: 0,05 kg (5%) |
| **Output materials (specified by type) as results of waste processing at the building site e.g. of collection for recycling, for energy recovering, disposal (specified by route)** | 0,056 kg Gypfine Almomtaz 120 to landfill<br>Packaging:<br>Bags: 7 g paper and 0,2 g of LDPE to Landfill<br>Pallet : 15 g to recycling |
| **Direct emissions to ambient air, soil and water** | 0,056 kg Gypfine Almomtaz 120 to landfill |

## Use stage (excluding potential savings), B1-B7

Description of the stage:
The use stage, related to the building fabric includes:

**B1,** use or application of the installed product;
**B2,** maintenance;
**B3,** repair;
**B4,** replacement;
**B5,** refurbishment;
**B6,** operational energy use
**B7,** operational water use

**Description of scenarios and additional technical information:**
The product has a reference service life of 50 years. This assumes that the product will last in situ with no requirements for maintenance, repair, replacement or refurbishment throughout this period. Therefore, it has no impact at this stage.

## Reuse/recovery/recycling potential, D

100% of wastes are landfilled. There is no reuse nor recovery nor recycling of this product. Hence, no recycling benefits are reported on stage D.

# LCA results

As specified in EN 15804:2012+A2:2019 and also the Product-Category Rules, the environmental impacts are declared and reported using the baseline characterization factors are from the ILCD. Specific data has been supplied by the plant, and generic data come from Gabi and Ecoinvent databases. All emissions to air, water, and soil, and all materials and energy used have been included. The declared product is mined. manufactured and marketed (99%) in Egypt and Lybia.

All figures refer to a functional unit of of 1 kg of installed Gypfine Almomtaz 12 compound for an expected average service life of 50 years

The following results corresponds to a single product manufactured in a single plant:

System boundaries (X=included, MND=module not declared)

| | PRODUCT STAGE | | | CONSTRUCTION STAGE | | USE STAGE | | | | | | | END OF LIFE STAGE | | | | BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Raw material supply | Transport | Manufacturing | Transport | Construction-Installation process | Use | Maintenance | Repair | Replacement | Refurbishment | Operational energy use | Operational water use | De-construction demolition | Transport | Waste processing | Disposal | Reuse-recovery |
| Module | A1 | A2 | A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
| Modules declared | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Geography | EG | EG | EG | EG LY | EG LY | - | - | - | - | - | - | - | EG LY | EG LY | EG LY | EG LY | EG LY |
| Specific data used | >90% GWP- GHG | | | | | | | | | | | | | | | | |
| Variation products | Only one product is reported in this EPD | | | | | | | | | | | | | | | | |
| Variation sites | Only one site is reported for this product | | | | | | | | | | | | | | | | |

Notice: The estimated impact results are only relative statements which do not indicate the end points of the impact categories, exceeding threshold values, safety margins or risks

# Environmental Impacts

| | | Product stage | Construction stage | | Use stage | | | | | | | End of life stage | | | | Reuse, Recovery Recycling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Environmental indicators** | A1 / A2 / A3 | A4 Transport | A5 Installation | B1 Use | B2 Maintenance | B3 Repair | B4 Replacement | B5 Refurbishment | B6 Operational energy use | B7 Operational water use | C1 Deconstruction / demolition | C2 Transport | C3 Waste processing | C4 Disposal | D Reuse, recovery, recycling |
|  | Climate Change [kg CO2 eq.] | 1,48E-01 | 1,76E-02 | 4,45E-02 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5,06E-03 | 2,74E-03 | 0 | 2,13E-02 | 0 |
| | Climate Change (fossil) [kg CO2 eq.] | 1,79E-01 | 1,75E-02 | 1,14E-02 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5,05E-03 | 2,73E-03 | 0 | 1,71E-02 | 0 |
| | Climate Change (biogenic) [kg CO2 eq.] | -3,07E-02 | -3,01E-05 | 3,31E-02 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6,66E-06 | -4,59E-06 | 0 | 4,14E-03 | 0 |
| | Climate Change (land use change) [kg CO2 eq.] | 1,61E-04 | 1,43E-04 | 1,84E-05 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1,11E-07 | 2,21E-05 | 0 | 4,93E-05 | 0 |
|  | Ozone depletion [kg CFC-11 eq.] | 2,65E-08 | 2,12E-18 | 1,33E-09 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5,37E-19 | 5,02E-19 | 0 | 6,36E-17 | 0 |
|  | Acidification terrestrial and freshwater [Mole of H+ eq.] | 1,10E-03 | 1,01E-04 | 6,83E-05 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1,49E-05 | 1,58E-05 | 0 | 1,23E-04 | 0 |
| | Eutrophication freshwater [kg P eq.] | 1,44E-05 | 5,36E-08 | 8,83E-07 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1,12E-09 | 8,32E-09 | 0 | 2,94E-08 | 0 |
|  | Eutrophication freshwater [kg (PO4)3 eq.] | 4,42E-05 | 1,65E-07 | 2,71E-06 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3,44E-09 | 2,55E-08 | 0 | 9,03E-08 | 0 |
| | Eutrophication marine [kg N eq.] | 1,76E-04 | 4,87E-05 | 1,47E-05 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2,76E-06 | 7,63E-06 | 0 | 3,17E-05 | 0 |
| | Eutrophication terrestrial [Mole of N eq.] | 1,81E-03 | 5,39E-04 | 1,44E-04 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3,03E-05 | 8,45E-05 | 0 | 3,48E-04 | 0 |
|  | Photochemical ozone formation - human health [kg NMVOC eq.] | 5,05E-04 | 9,18E-05 | 3,73E-05 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8,69E-06 | 1,45E-05 | 0 | 9,59E-05 | 0 |
|  | Resource use, mineral and metals [kg Sb eq.] | 6,29E-07 | 1,26E-09 | 3,15E-08 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1,32E-10 | 2,21E-10 | 0 | 1,54E-09 | 0 |
| | Resource use, energy carriers [MJ] | 2,64E+00 | 2,35E-01 | 1,59E-01 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6,17E-02 | 3,65E-02 | 0 | 2,25E-01 | 0 |
|  | Water deprivation potential [m³ world equiv.] | 3,16E-02 | 1,58E-04 | 2,74E-02 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1,05E-05 | 2,66E-05 | 0 | 1,80E-03 | 0 |

# Resources Use

| | Resources Use indicators | Product stage | Construction stage | | Use stage | | | | | | | End of life stage | | | | Reuse, Recovery Recycling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | A1 / A2 / A3 | A4 Transport | A5 Installation | B1 Use | B2 Maintenance | B3 Repair | B4 Replacement | B5 Refurbishment | B6 Operational energy use | B7 Operational water use | C1 Deconstruction / demolition | C2 Transport | C3 Waste processing | C4 Disposal | D Reuse, recovery, recycling |
| | Use of renewable primary energy (PERE) [MJ] | 3,46E-01 | 1,32E-02 | 1,83E-02 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2,15E-04 | 2,11E-03 | 0 | 2,95E-02 | 0 |
| | Primary energy resources used as raw materials (PERM) [MJ] | 2,63E-01 | 0 | 1,32E-02 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Total use of renewable primary energy resources (PERT) [MJ] | 6,09E-01 | 1,32E-02 | 3,14E-02 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2,15E-04 | 2,11E-03 | 0 | 2,95E-02 | 0 |
| | Use of non-renewable primary energy (PENRE) [MJ] | 2,63E+00 | 2,35E-01 | 1,58E-01 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6,18E-02 | 3,66E-02 | 0 | 2,25E-01 | 0 |
| | Non-renewable primary energy resources used as raw materials (PENRM) [MJ] | 1,02E-02 | 0 | 5,09E-04 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Total use of non-renewable primary energy resources (PENRT) [MJ] | 2,64E+00 | 2,35E-01 | 1,59E-01 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6,18E-02 | 3,66E-02 | 0 | 2,25E-01 | 0 |
| | Input of secondary material (SM) [kg] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Use of renewable secondary fuels (RSF) [MJ] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Use of non-renewable secondary fuels (NRSF) [MJ] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Use of net fresh water (FW) [$m^3$] | 7,51E-04 | 1,53E-05 | 6,40E-04 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3,83E-07 | 2,46E-06 | 0 | 5,67E-05 | 0 |

*For this study, both the product and its packaging are reported in the indicators "Use of renewable primary energy resources used as raw materials" ("PERM") and "Use of non-renewable primary energy resources used as raw materials" ("PENRM"). PERM and PENRM are reported as negative values were materials are recycled or recovered, but not when landfilled.

# Waste Category & Output flows

| | Waste Category & Output Flows | Product stage | Construction stage | | Use stage | | | | | | | End of life stage | | | | Reuse, recovery, recycling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | A1 / A2 / A3 | A4 Transport | A5 Installation | B1 Use | B2 Maintenance | B3 Repair | B4 Replacement | B5 Refurbishment | B6 Operational energy use | B7 Operational water use | C1 Deconstruction / demolition | C2 Transport | C3 Waste processing | C4 Disposal | D Reuse, recovery, recycling |
|  | Hazardous waste disposed (HWD) [kg] | 8,23E-09 | 1,09E-08 | 1,20E-09 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6,26E-12 | 1,69E-09 | 0 | 3,43E-09 | 0 |
|  | Non-hazardous waste disposed (NHWD) [kg] | 5,26E-05 | 3,60E-05 | 6,27E-02 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1,53E-05 | 5,80E-06 | 0 | 1,13E+00 | 0 |
|  | Radioactive waste disposed (RWD) [kg] | 1,89E-06 | 2,91E-07 | -2,71E-07 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7,09E-08 | 6,75E-08 | 0 | 2,56E-06 | 0 |
|  | Components for re-use (CRU) [kg] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|  | Materials for Recycling (MFR) [kg] | 1,19E-01 | 0 | 2,10E-02 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|  | Material for Energy Recovery (MER) [kg] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|  | Exported electrical energy (EEE) [MJ] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|  | Exported thermal energy (EET) [MJ] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## Information on biogenic carbon content

| | Biogenic Carbon Content | Product stage |
|---|---|---|
| | Biogenic carbon content in product [kg C] | A1 / A2 / A3 |
| | Biogenic carbon content in packaging [kg C] | 6,39E-03 |

*Note: 1 kg biogenic carbon is equivalent to 44/12 (approx. 3,67) kg $CO_2$.*

# LCA results interpretation

The following figure refers to a functional unit of 1 kg of installed Almomtaz 120 smoothing compound for an expected average service life of 50 years.


*[1] This indicator corresponds to the abiotic depletion potential of fossil resources.*
*[2] This indicator corresponds to the total use of primary energy.*
*[3] This indicator corresponds to the use of net fresh water.*
*[4] This indicator corresponds to the sum of hazardous, non-hazardous and radioactive waste disposed.*

**Global Warming Potential (Climate Change) (GWP)**
For GWP, the majority of contribution to this environmental impact is from the production modules (A1 – A3). This is primarily because the sources of greenhouse gas emissions are predominant in this part of the life cycle. $CO_2$ is generated upstream from the production of electricity and is also released on site by the

combustion of coke, diesel and natural gas. We can see that other sections of the life cycle also contribute to the GWP. However, the production modules contribute to over 40% of the contribution. Emissions from A4 (transport to clients), waste disposal transportation in A5 (disposal after installation) and C (transport and disposal at the end of life) generate the second highest percentage of greenhouse gas emissions.

**Non-renewable resources consumptions**
The consumption of non – renewable resources is once more found to have the highest value in the production modules. Due to coke, diesel and natural gas consumption within the factory. For non – renewable fuels such as coal and oil are used to generate electricity during manufacturing. The contribution to this impact from the other modules is very small and primarily due to the non – renewable resources consumed during installation.

**Energy Consumptions**
Modules A1 – A3 have the highest contribution to total energy consumption. Energy is consumed in the form of electricity, coke, diesel and natural gas during the manufacture of plasterboard.

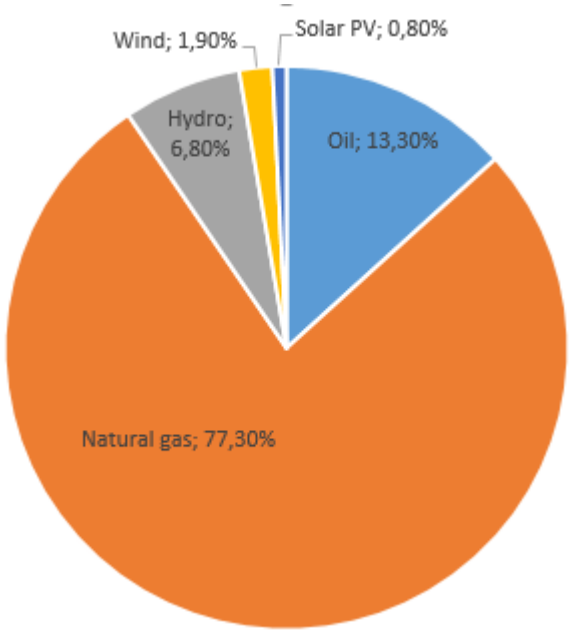
**Water Consumption**
Water is used within the manufacturing facility and therefore we see the highest contribution in the production phase. The second highest contribution occurs in the installation site due to the water used on the joint components.

**Waste Production**
The largest contributor is the end of life module. This is because the 100% of the product is assumed to be sent to landfill once it reaches the end of life state.

# Additional information

## Electricity description

| TYPE OF INFORMATION | DESCRIPTION |
|---|---|
| Location | Representative of Electricity purchased by Gyproc Egypt Saint-Gobain |
| Geographical representativeness description | Oil 13,3%<br>Natural gas 77,3%<br>Hydro 6,8%<br>Wind 1,9%<br>Solar PV 0,8% |
| Reference year | 2018 |
| Type of data set | Cradle to gate from Thinkstep database |
| Source | IEA Data and Statistic |
| $CO_2$ emission kg $CO_2$ eq. / kWh | 0,683 (Ecoinvent 3.6 and EN15804+A2 GWP) |




## Data quality

Inventory data quality is judged by geographical, temporal, and technological representativeness. To cover these requirements and to ensure reliable results, first-hand industry data crossed with LCA background datasets were used. The data was collected from internal records and reporting documents from Saint-Gobain Gyproc Egypt. After evaluating the inventory, according to the defined ranking in the LCA report, the assessment reflects good inventory data quality for the geographical, temporal and technological categories.

## Environmental impacts according to EN 15804:2012 + A1

The following tables presents results of 1 kg of installed Almomtaz 120 smoothing compound for an expected average service life of 50 years according to EN 15804:2012 +A1.

| | Product stage | Construction stage | | Use stage | | | | | | | End of life stage | | | | Reuse, recovery, recycling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A1 / A2 / A3 | A4 Transport | A5 Installation | B1 Use | B2 Maintenance | B3 Repair | B4 Replacement | B5 Refurbishment | B6 Operational energy use | B7 Operational water use | C1 Deconstruction / demolition | C2 Transport | C3 Waste processing | C4 Disposal | D Reuse, recovery, recycling |
| Global Warming Potential (GWP) [kg $CO_2$ eq.] | 1,77E-01 | 1,73E-02 | 1,13E-02 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4,98E-03 | 2,69E-03 | 0 | 1,68E-02 | 0 |
| Ozone depletion (ODP) [kg R11 eq.] | 2,21E-08 | 2,82E-18 | 1,10E-09 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7,16E-19 | 6,69E-19 | 0 | 8,48E-17 | 0 |
| Acidification potential (AP) [kg R11 eq.] | 9,34E-04 | 6,89E-05 | 5,67E-05 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1,24E-05 | 1,09E-05 | 0 | 9,88E-05 | 0 |
| Eutrophication potential (EP) [kg Phosphate eq.] | 1,70E-04 | 1,73E-05 | 1,60E-05 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9,84E-07 | 2,72E-06 | 0 | 1,11E-05 | 0 |
| Photochemical ozone creation [kg Ethene eq.] | 2,09E-05 | 2,39E-06 | 1,99E-06 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9,07E-07 | 3,81E-07 | 0 | 7,95E-06 | 0 |
| Abiotic depletion potential for non-fossil resources (ADP-elements) [kg Sb eq.] | 3,40E-05 | 1,43E-09 | 1,70E-06 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1,39E-10 | 2,47E-10 | 0 | 5,94E-09 | 0 |
| Abiotic depletion potential for fossil resources (ADP-fossil fuels) [MJ] | 2,56E+00 | 2,34E-01 | 1,56E-01 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6,16E-02 | 3,64E-02 | 0 | 2,19E-01 | 0 |

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